



# ICAO ENGINE EXHAUST EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: Trent 1000-M3 BYPASS RATIO: 8.9  
 UNIQUE ID NUMBER: 01P19RR114 PRESSURE RATIO ( $\pi_{co}$ ): 48.7  
 COMBUSTOR: Phase5 Tiled  
 ENGINE TYPE: TF RATED THRUST ( $F_{oo}$ ) (kN): 358.1

REGULATORY DATA **\*\* DATA SUPERSEDED \*\*** SEE FOLLOWING UID FOR REVISED DATA: **02P23RR134**

CHARACTERISTIC VALUE:	HC	CO	NO <sub>x</sub>	SMOKE NUMBER
D <sub>p</sub> /F <sub>oo</sub> (g/kN) or SN	0.0	8.3	74.1	16.4
AS % OF ORIGINAL LIMIT	0.0	7.1	53.9	98.2
AS % OF CAEP/2 LIMIT (NO <sub>x</sub> )			67.4	
AS % OF CAEP/4 LIMIT (NO <sub>x</sub> )			71.0	
AS % OF CAEP/6 LIMIT (NO <sub>x</sub> )			76.9	
AS % OF CAEP/8 LIMIT (NO <sub>x</sub> )			84.6	

For non-volatile particulate matter (nvPM) emissions, please refer to the ICAO Engine nvPM Emissions Data Sheet.

### DATA STATUS

- PRE-REGULATION  
 x CERTIFICATION  
 - REVISED (SEE REMARKS)

### TEST ENGINE STATUS

- NEWLY MANUFACTURED ENGINES  
 x DEDICATED ENGINES TO PRODUCTION STANDARD  
 - OTHER (SEE REMARKS)

### EMISSIONS STATUS

x DATA CORRECTED TO REFERENCE  
 (ANNEX 16 VOLUME II)

### CURRENT ENGINE STATUS

(IN PRODUCTION, IN SERVICE UNLESS OTHERWISE NOTED)  
 - OUT OF PRODUCTION (DATE: - )  
 - OUT OF SERVICE (DATE: - )

### MEASURED DATA

MODE	POWER SETTING (%F <sub>oo</sub> )	TIME (minutes)	FUEL FLOW (kg/s)	EMISSIONS INDICES (g/kg)			SMOKE NUMBER
				HC	CO	NO <sub>x</sub>	
TAKE-OFF	100	0.7	2.721	0.00	0.43	59.30	7.6
CLIMB OUT	85	2.2	2.222	0.00	0.44	44.55	10.2
APPROACH	30	4.0	0.712	0.00	0.59	14.72	9.4
IDLE	7	26.0	0.260	0.00	6.13	6.61	1.8
LTO TOTAL FUEL (kg) or EMISSIONS (g)			983	0	2760	25036	-
NUMBER OF ENGINES				3	3	3	6
NUMBER OF TESTS				7	7	7	8
AVERAGE D <sub>p</sub> /F <sub>oo</sub> (g/kN) or AVERAGE SN (MAX)				0.0	7.7	69.9	15.3
SIGMA (D <sub>p</sub> /F <sub>oo</sub> in g/kN, or SN)				0.0	1.4	1.3	1.7
RANGE (D <sub>p</sub> /F <sub>oo</sub> in g/kN, or SN)				0.0	6.25-8.96	68.47-70.73	12.1-16.8

### ACCESSORY LOADS

POWER EXTRACTION 0 (kW) AT - POWER SETTINGS  
 STAGE BLEED 0 (% CORE FLOW) AT - POWER SETTINGS

### ATMOSPHERIC CONDITIONS

BAROMETER (kPa)	98.9-102.1
TEMPERATURE (K)	275-304.6
ABS HUMIDITY (kg/kg)	0.00308-0.01935

### FUEL

SPEC	
H/C	1.91
AROM (%)	17.2

MANUFACTURER: Rolls-Royce plc  
 TEST ORGANIZATION: Rolls-Royce  
 TEST LOCATION: Derby  
 TEST DATES: 07/02/2011-30/11/2017

### NO<sub>x</sub> REGULATION PARAGRAPH

	2.3.2 c) (CAEP/4)
	2.3.2 d) (CAEP/6)
x	2.3.2 e) (CAEP/8)

### REMARKS

- Data from Certification Report EDNS01000615769
- Certification in accordance with Part III, Chapter 2, of Amendment 8 of ICAO Annex 16 Vol. II.
- NO<sub>x</sub> levels in accordance with Part III, Chapter 2, 2.3.2 e) (CAEP/8)

Compliance with Fuel Venting requirements:

x ('x' if complies, 'PR' if pre-regulation, '-' if information is not available)